

Application No.: 09/888,644

Docket No.: 503.40291X00

REMARKS

Reconsideration and allowance of this application, as amended, is respectfully requested.

This Amendment is in response to the Office Action dated February 20, 2004.

By the present amendment, each of the independent claims 1, 12 and 22 has been amended to further clarify the invention, as will be discussed below.

Reconsideration and allowance of amended independent claims 1, 12, and 22, and their respective dependent claims, over the cited primary reference to Nakamura (USP 6,411,273), whether considered alone or in combination with Lin (USP 6,344,814) and/or Jeong (USP 6,373,459) is respectfully requested. With regard to this, it is noted that each of the independent claims 1, 12, and 22 have now been amended to define the independent nature of the first and second DA converters, both in terms of their connection to the display unit and their operation. This can be appreciated, for example, from the first embodiment of the invention shown in Fig. 1 (noting that reference to Fig. 1 is solely for purposes of example). As illustrated there, a first DA converter, that is, a low power consumption DA converter 6 is interposed between the display unit 50 and a frame memory SRAM 7. On the other hand, a second DA converter, that is, the high-precision DA converter 11, is separately connected (that is, separate from the low power consumption DA converter 6) between the display unit 50 and a line memory 12. Thus, as clearly shown in Fig. 1, the first and second DA converters are connected to the display unit 50 separately from one another.

Referring to page 7, line 21 et seq. of the Substitute Specification filed on December 10, 2001, a description is provided in which it is set forth that the outputs

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of the low power consumption DA converter 6 and the high precision DA converter 11 are independently supplied to the display unit 50, under the control of the MPU 15 and the TCON 14, depending upon whether the "low power consumption display mode" is selected or the "high definition display mode" is selected. More particularly, as noted beginning on page 7, line 24 of the Substitute Specification:

"When selecting the "Low power consumption display mode", MPU 15 and TCON 14 write data in the panel and read the image display data from frame memory 7 to MPU 15 by entirely using frame memory 7. The image display data written in frame memory 7 is read one-by-one and is input to low power consumption DA converter 6. ...The highly accurate DA converter 11, line memory 12, DRAM or frame memory 13, etc., are not driven in this "Low power consumption display mode". Therefore, it is clear that those units of the equipment do not consume the electric power."

In other words, in the "low power consumption display mode", the low power consumption DA converter 6 is operating independently of the high precision of the DA converter 11 (noting that the high-precision DA converter is not operating at all since it consumes no power).

On the other hand, as discussed on page 8, line 13 et seq. of the Substitute Specification:

"Next, when the "high-definition display mode" is selected MPU 15 writes data in the panel and reads the image display data from the frame memory 13 to MPU 15 by entirely using frame memory 13. The image display data written in frame memory 13 is read one-by-one and is input to highly accurate DA converter 11 through TCON 14 and line memory 12. ...The low power consumption DA converter is not driven during this "high-definition display mode".

Thus, again, the high precision DA converter 11 is operated to provide an output to the display unit 50 which is independent of the operation of the low power

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consumption DA converter (which, as noted above, is not driven during the high definition display mode).

Turning to the primary reference to Nakamura, and particularly Fig. 6 of that document, as pointed out in the Office Action, Nakamura teaches a first DA converter 41 and a second DA converter 42 which are part of an LCD driver for a display unit. As discussed on column 39, line 6 et seq. of the Nakamura specification, the first DA converter 41 operates on the more significant bits D3 and D2 of a digital signal. The analog output with regard to these more significant bits D2 and D3 are provided in the middle of Fig. 6 at the terminals VH2 and VL2. On the other hand, the second DA converter 42 operates on the less significant bits D0 and D1 of the input signal. More specifically, as noted in column 39, line 55 et seq. of Nakamura:

"The second DAC section 42 basically operates according to the same manner as the embodiment shown in Fig. 3. Using as a reference voltage of the terminal VH2 and the terminal VL2 connected to the first DAC section, the switching elements Tr0L, Tr0H, Tr1L, and Tr1H are switched in response to the digital input signals D0 and D1, and one of the four potentials equally divided between the terminal VH2 and VL2 is alternately selected and outputted to the terminal 300."

In other words, the first and second DA converters 41 and 42 operate as a two stage unit to provide a final output to the terminal 300. To put this another way, the second DA converter 42 requires the output of the first DA converter 41 to provide the output to the terminal 300. On the other hand, the first DA converter 41 is not independently connected to the display unit, but, instead, provides its output to the second DA converter 42 so that the second DA converter 42 can provide the ultimate output to the display unit. Thus, the first and second DA converters 41 and 42 of

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Nakamura are interdependent on one another rather than independent of one another.

By the present Amendment, each of the independent claims 1, 12 and 22 has been amended to specifically define:

"converter each of the first and second DA converters being connected to said display unit separately from one another so that said first DA converter and said second DA converter can respectively supply an output to the display unit independently of one another"

As such, the claims now require both that the first and second DA converters are connected to the display unit separately from one another, and that the first and second DA converters can respectively supply an output to the display unit independently of one another. This is clearly not the case in the primary reference to Nakamura. In the first place, as noted above, the first and second DA converters 41 and 42 of Nakamura are not separately connected to the display unit. Instead, they are connected in a serial fashion to the display unit to provide a two stage interrelated operation. In the second place, it is not possible for the first and second DA converters 41 and 42 to independently provide an output to the display unit. The DA unit 42 is connected to the display unit through the terminal 300, but requires the reference signals at the terminal VH2 and VL2 from the first DA converter 41 in order to operate (as noted above with regard to column 39, line 55 et seq.). The first DA converter 41, on the other hand, does not provide a direct output to the terminal 300, but, instead, serves to provide reference voltages to the second DA converter 42 providing the ultimate output to the terminal 300. As such, it is respectfully submitted that each of the independent claims 1, 12 and 22 clearly defines over the primary

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reference to Nakamura, and reconsideration and allowance of these amended claims, together with their respective dependent claims, is respectfully requested.

The cited secondary references to Lin, Jeong and Zavracky (USP 6,552,704) are of general interest with regard to the points raised in the Office Action concerning them. On the other hand, none of these reference, nor the previously cited reference to Nakajima from the last Office Action (referred to in passing in the present Office Action, for example, in the last paragraph on page 3) provide any teachings which would make up for the shortcomings of the primary reference to Nakamura in arriving at the present claimed invention. In other words, none of these references provide any teaching which would call for the separate connection of first and second DA converters to a display unit to permit the claimed independent outputting of analog data from the first DA converter or the second DA converter. Accordingly, reconsideration and allowance of the independent claims 1, 12 and 22, as well as their respective dependent claims, over the cited combinations of Nakamura, Lin, Jeong, Zavracky and/or Nakajima is respectfully requested.

If the Examiner believes that there are any other points which may be clarified or otherwise disposed of either by telephone discussion or by personal interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Antonelli, Terry, Stout & Kraus,

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LLP Deposit Account No. 01-2135 (Docket No. 503.40219X00), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By



Gregory E. Montone
Reg. No. 28,141

GEM/dlt

1300 North Seventeenth Street, Suite 1800
Arlington, Virginia 22209
Telephone: (703) 312-6600
Facsimile: (703) 312-6666